

COURSE OVERVIEW PE0910
Refinery Production Operations & Petroleum Products

Course Title

Refinery Production Operations & Petroleum Products

Course Date/Venue

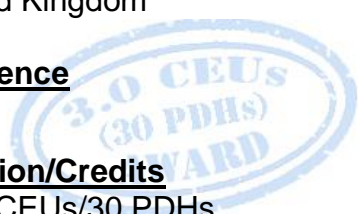
March 04-08, 2024/Midtown Board Room,
 Hampton Inn Houston Downtown by Hilton,
 London, United Kingdom

Course Reference

PE0910

Course Duration/Credits

Five days/3.0 CEUs/30 PDHs



Course Description



This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.



The demand for petroleum products is increasing throughout the world. Traditional markets such as North America and Europe are experiencing moderate increase in demand, whereas the other emerging markets are witnessing a rapid surge. This has resulted in a squeeze on existing refineries, prompting a fresh technological approach to optimize efficiency and throughput. Major oil companies and technology suppliers/licensors are investing heavily to revamp their refining technologies in an effort to cater to the growing needs of customers.



Even though the nature of crude oil is changing, refineries are here to stay in the foreseeable future, since petroleum products satisfy wide-ranging energy requirements/demands that are not fully catered to by natural gas, liquefied petroleum gas (LPG), or coal. Refineries are eager to adapt to changing circumstances and are amenable to trying new technologies that are radically different in character. This is evident from the increasing use of different types of refinery process technology and novel separation methods.

This course will give an up-to-date overview of most of the refinery production technologies employed by refineries around the world and it is designed provide an extensive and deep knowledge as well as the description of the technology. Further, this course will guide the participants to develop key concepts and techniques to operate, select and optimize refinery processes.

The course covers a wide range of topics such general chemistry, organic, chemical used in refinery processes, refinery infrastructure, refinery feedstocks, crude distillation, coking & thermal processes, catalytic cracking, catalytic hydrocracking, hydroprocessing & resid processing, hydrotreating, catalytic reforming & isomerization, alkylation & polymerization, product blending, supporting processes, lubricating oil blending stocks, petrochemical feedstocks, additives production from refinery feedstocks, maintenance & safety and environmental considerations

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply systematic techniques and procedures on refinery production operations and petroleum products
- Analyze the usage, optimization, hazards & preventions, storage and specifications of chemicals used in the refinery process
- Discuss refinery infrastructure and refinery products
- Enumerate refinery feedstocks and illustrate the types of crude distillation, crude products, types & properties of coking & thermal processes
- Carryout types and new designs of catalytic cracking, catalytic hydrocracking, feed pretreating, process variables, heat recovery, hydroprocessing and resid processing
- Employ hydrotreating catalyst as well as catalytic reforming and isomerization yields
- Demonstrate alkylation types, process variables, feedstocks and reactions along with product blending and supporting processes
- Determine lubricating oil blending stocks & processes and discuss petrochemical feedstocks, types of production and additives production from refinery feedstocks

Who Should Attend

This course provides an overview of all significant aspects and considerations of refinery production operations and petroleum products for all engineering and operations staff. Further, the course is suitable for maintenance, facility integrity, pipelines/piping, quality, Health, Safety and Environmental personnel who are seeking to improve their knowledge and skills on refinery processes and gain exposure on refinery concepts and technology including the operation, safety and control aspects.

Course Fee

US\$ 8,800 per Delegate + **VAT**. This rate includes Participants Pack (Folder, Manual, Hand-outs, etc.), buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations


Certificates are accredited by the following international accreditation organizations:-

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The International Accreditors for Continuing Education and Training (IACET - USA)

Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units (CEUs)** in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

Haward Technology Middle East will award **3.0 CEUs** (Continuing Education Units) or **30 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

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British Accreditation Council (BAC)

Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

Accommodation

Accommodation is not included in the course fees. However, any accommodation required can be arranged at the time of booking.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:



Mr. Pete Du Plessis, MSc, BSc, is a **Senior Process & Safety Engineer** within the **Oil, Gas** and **Petrochemical** industries. His expertise widely covers in the areas of **Process Plant Troubleshooting**, **Engineering Problem Solving**, **Process Plant Optimization** Technology & Continuous Improvement, **Refinery Operational Planning & Profitability**, **Process Plant Rehabilitation**, **Revamping & Debottlenecking**, **Chemical Plants Troubleshooting**, **Flare Relief Systems**, **Risk Assessment** within Production Operation, **Hazard Identification**, **Safety Auditing**, **Site Inspection**, Quantified Risk Assessment (**QRA**), Process Hazard Analysis (**PHA**), Process Safety Management (**PSM**), **HAZOP** Studies & Leadership, **FMEA**, **Waste Management**, Industrial Effluents, **Chemical Handling**, **Emergency Response Services**, **HAZCOM**, **HAZWOPER** and **HAZMAT** with over **30 years** of practical experience in the **process** industry. His wide experience also includes **Environmental Management (ISO 14001)**, **Safety Management (OHSAS 18001)**, **Quality Management (ISO 9001)**.

While Mr. Du Plessis has been very active in the process industry he has likewise headed Consultancy projects for major **petrochemical companies**. In all his projects, he utilizes a systems approach which includes **risk management**, **process safety**, health & environmental management, human behaviour and quality management. Furthermore, he has come to share his expertise through the **numerous international trainings** he has held on **PHA**, **HAZOP**, **Risk Assessment**, Handling **Hazardous Materials & Chemicals**, Petroleum Products Handling & Transportation. Moreover, he completed various assignments as a consultant, trainer, facilitator, auditor & designer and conducted numerous licensed international Safety, Technology and Auditing Awareness & Implementing training courses including **IMS**, **ISO 9001**, **ISO 14001**, **ISO 27001**, **ISO 17799**, **OHSAS 18001** audits & assessments. With his accomplishments and achievements, he had been a **Safety Superintendent**, **Senior Safety Official** and **Senior Process Controller** for several international petrochemical companies.

Mr. Plessis has **Bachelor** degree with **Honours** in **Industrial Engineering & Management**. Further, he has gained **Diploma** in **Quality & Production Management**. He is also a **Certified Assessor & Moderator** with the Manufacturing, Engineering & Related Services Education and Training Authority (MERSETA), a **Certified Trainer/Assessor** by the **Institute of Leadership & Management (ILM)** and a **Certified Instructor/Trainer** by the APICS. He has further delivered numerous trainings, courses, seminars, conferences and workshops internationally.



Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

- 30% Lectures
- 20% Practical Workshops & Work Presentations
- 30% Hands-on Practical Exercises & Case Studies
- 20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the course for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: Monday, 04th of March 2024

0730 – 0800	Registration & Coffee
0800 – 0815	Welcome & Introduction
0815 – 0830	PRE-TEST
0830 – 0930	Industry Background
0930 – 0945	Break
0945 – 1100	General Chemistry Basic Material • Basic Chemical Reaction • Theory of Gases
1100 – 1215	Organic Chemistry Structure of Organic Compounds • Reaction of Organic Compounds • Detail Study of Alkenes • Alkenes • Aromatics & Alcohol • Nitrogen Compounds
1215 – 1230	Break
1230 – 1330	Chemical Used in Refinery Processes Nature of Chemical • Optimization Usage • Chemical Hazards and Prevention • Safe Storage of the Chemicals • Petroleum Product Specification and Testing
1330 – 1420	Refinery Infrastructure Refinery Products • Characteristics of Crude and Products • Product Specifications and Tests • Low-Boiling Products • Gasoline • Gasoline Specifications • Distillate Fuels • Jet and Turbine Fuels • Automotive Diesel Fuels • Railroad Diesel Fuels • Heating Oils • Residual Fuel Oils
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day One



Day 2: Tuesday, 05th of March 2024

0730 – 0930	Refinery Feedstocks Crude Oil Properties • Crudes Suitable for Asphalt Manufacture • Crude Distillation Curves
0930 – 0945	Break
0945 – 1030	Crude Distillation Desalting Crude Oils • Atmospheric Topping Unit • Vacuum Distillation • Auxiliary Equipment • CDU Overhead Condenser Control • Crude Distillation Unit Products
1030 – 1100	Case Study Problem # 1 Crude Units
1100 – 1215	Coking and Thermal Processes Types , Properties & Uses of Petroleum Coke • Process Description-Delayed Coking • Operation-Delayed Coking • Process Description-Flexicoking • Process Description-Fluid Coking • Yields from Flexicoking & Fluid Coking • Capital Cost & Utilities for Flexicoking & Fluid Coking • Visbreaking
1215 – 1230	Break
1230 – 1420	Case Study Problem # 2 Delayed Coker
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Two

Day 3: Wednesday, 06th of March 2024

0730 – 0830	Catalytic Cracking Fluidized-Bed Catalytic Cracking • New Designs for Fluidized-Bed Catalytic Cracking Units • Cracking Reactions • Cracking of Paraffins • Olefin Cracking • Cracking of Naphthenic Hydrocarbons • Aromatic Hydrocarbon Cracking • Cracking Catalysts • FCC Feed Pretreating • Process Variables • Heat Recovery • Yield Estimation • Capital & Operating Costs
0830 – 0930	Case Study Problem #3 Catalytic Cracker
0930 – 0945	Break
0945 – 1100	Catalytic Hydrocracking Hydrocracking Reactions • Feed Preparation • The Hydrocracking Process • Hydrocracking Catalyst • Process Variables • Hydrocracking Yields • Investment & Operating Costs • Modes of Hydrocracker Operation
1100 – 1130	Case Study Problem #4 Hydrocracker
1130 – 1215	Hydroprocessing and Resid Processing Composition of Vacuum Tower Bottoms • Processing Options • Hydroprocessing • Expanded-Bed Hydrocracking Process • Moving-Bed Hydroprocessors • Solvent Extraction • Summary of Resid Processing Operations
1215 – 1230	Break
1230 – 1300	Hydrotreating Hydrotreating Catalysts • Naphtha & Distillate Hydrotreating • Aromatics Reduction • Reactions • Process Variables • Construction & Operating Costs





1300 – 1330	Case Study Problem #5 Hydrotreaters
1330 – 1400	Catalytic Reforming and Isomerization Platforming • Reactions • Feed Preparation • Catalytic Reforming Processes • Reforming Catalyst • Reactor Design • Yields and Costs • Isomerization • Capital & Operating Costs • Penex Processes • Isomerization Yields
1400 – 1420	Case Study Problem #6 Naptha Hydrotreater, Catalytic Reformer & Isomerization Unit
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Three

Day 4: Thursday, 07th of March 2024

0730 – 0830	Alkylation and Polymerization Alkylation Reactions • Process Variables • Alkylation Feedstocks • Alkylation Products • Catalyst • Hydrofluoric Acid Processes • Sulfuric Acid Alkylation • Comparison of Processes • Alkylation Yields & Cost • Polymerization
0830 – 0930	Case Study Problem # 7 Alkylation & Polymerization
0930 – 0945	Break
0945 – 1100	Product Blending Reid Vapor Pressure • Octane Blending • Blending for Other Properties
1100 – 1215	Case Study Problem # 8 Gasoline Blending
1215 – 1230	Break
1230 – 1330	Case Study Problem # 9 Diesel & Jet Fuel Blending
1330 – 1400	Supporting Processes Hydrogen Production & Purification • Gas Processing Unit • Acid Gas Removal • LPG Treating • Merox Processes • DHDS Processes • Sulfur Recovery Processes • SRU Processes • Ecological Considerations in Petroleum Refining • Waste Water Treatment • Control of Atmospheric Pollution • Noise Level Control
1400 – 1420	Case Study Problem # 10 Saturated Gas Recovery, Amine & Sulfur Recovery Units
1420 – 1430	Recap Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today & Advise Them of the Topics to be Discussed Tomorrow
1430	Lunch & End of Day Four

Day 5: Friday, 08th of March 2024

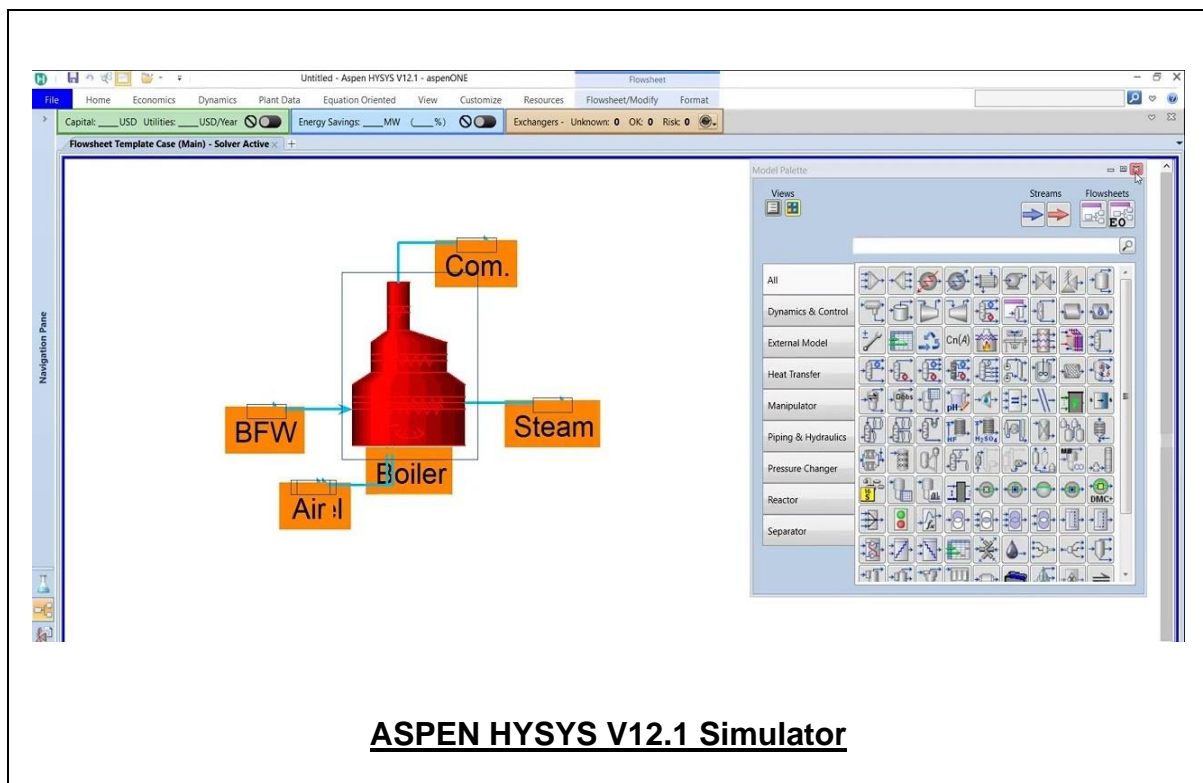
0730 – 0930	Lubricating Oil Blending Stocks Lube Oil Processing • Propane Deasphalting • Viscosity Index Improvement and Solvent Extraction • Viscosity Index Improvement & Hydrocracking • Dewaxing • Hydrofinishing • Finishing by Clay Contacting • Environmental Impacts
0930 – 0945	Break



0945 – 1100	Petrochemical Feedstocks <i>Aromatics Production • Unsaturate Production • Saturate Paraffins</i>
1100 – 1215	Additives Production From Refinery Feedstocks <i>Use of Alcohols & Ethers • Ether Production Reactions • Ether Production Processes • Yields • Cost of Ether Production • Production of Isobutylene • Commercial Dehydrogenation Processes • Houdry's CATOFIN • Phillips Petroleum's STAR • UOP LLC's OLEFLEX • Snamprogetti/Yarsintez Process • Costs to Produce Isobutylene from Isobutane • International Union of Pure & Applied Chemists</i>
1215 – 1230	Break
1230 – 1300	Maintenance & Safety
1300 – 1345	Environmental Consideration
1345 – 1400	Course Conclusion <i>Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course</i>
1400 – 1415	POST-TEST
1415 – 1430	<i>Presentation of Course Certificates</i>
1430	<i>Lunch & End of Course</i>

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using the “ASPEN HYSYS V12.1” simulator.



Course Coordinator

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